Hanford Advisory Board Advice: Testing Safety Culture in Practice,
Draft 3, Feb 3, 2016
Lead Issue Managers: Dirk Dunning and Liz Mattson

Background

The Hanford Advisory Board (HAB, Board) has been focused on reviewing, discussing, and issuing advice on safety culture since the Defense Nuclear Facilities Safety Board issued its Recommendation 2011-1: Safety Culture at the Waste Treatment and Immobilization Plant in June 2011.

Safety culture terminology has created confusion in our discussions, as board members and agency staff define "safety culture" differently. The Board is concerned that our imprecise communication about safety culture has and will continue to create problems as we assess how the problem has been defined and what is being done to remedy the problem. In this advice, we propose the new terminology, Safe by Design**, in an attempt to bring clarity and precision to our conversations, in the hope that this clarity will enable us to more accurately talk about and assess efforts for improvement.

DOE has established definitions for Organizational Culture, Safety Culture and a Safety Conscious Work Environment (Julie A. Goeckner, DOE Senior Advisor for Nuclear Safety Culture). These definitions[1] are:

- **"Organizational Culture:** A set of commonly shared beliefs, expectations, and values that influence and guide the thinking and behavior or organizational members, and are reflected in how work is carried out."
- **"Safety Culture:** An organization's values and behaviors modeled by its leaders and internalized by its members, which serve to make safe performance of work the overriding priority to protect the workers, the public, and the environment."
- **"Safety Conscious Work Environment:** A work environment in which employees feel free to raise safety concerns to management (or a regulator) without fear of retaliation."

The Board proposes adding "Safe by Design**" to our vocabulary in future discussions between the Board and the Tri-Party agencies, which is defined as followed:

- **Safe by Design**:** Safety designed and built into systems from the start. Constantly question and challenge design, operations, procedures, and actions.

The Board is concerned that the current safety culture evaluation process is more reactive than proactive. The biggest breakdown in our conversations to date involve ensuring that safety is designed in from the very beginning. This includes all work from concept and system designs, through processes and construction, focused most heavily on the initial concepts and designs. This is what we mean by the phrase "Safe by Design**."

The Board is ~~also~~ concerned that the current focus on safety culture may inadvertently result in undesirable impacts to the environment and possible impacts to public health. The Board believes DOE

[1] Julie A. Goeckner, DOE Senior Advisor for Nuclear Safety Culture, EMSSAB presentation April 23, 2015, http://www.energy.gov/sites/prod/files/2015/04/f22/Safety%20Culture%20Overview.FINAL_.pdf

should ensure that strong environmental and public health protection is incorporated in and throughout all of these processes. The Board also believes that in all of these processes, it is important that concerns and dissenting opinions receive due consideration and thorough review.

DOE uses a complex set of Regulations, Orders, Manuals, Standards and Guides to consider and evaluate safety. This bewildering array of requirements and processes is itself a problem. Of these, DOE-STD-1189, March 2008, "Integration of Safety into the Design Process" is particularly important. This Standard goes a long way toward having designers consider safety in design and to applying principles, to minimize hazardous materials, to prefer passive controls, and to emphasize engineered controls over safety equipment.

It requires among other things that a multi-disciplinary team be identified to analyze the hazards in the facility and to ensure the designed controls do four things: 1) be adequate to perform the safety function, 2) not create an undue burden on operations, 3) be designed to fulfill the safety function, and 4) fit within the project cost and schedule (page 7). Note that the first requirement is only that the safety be adequate.

This approach emphasizes incorporating safety as an add-on to the design, rather than as a major factor in conceptual and operational design choices. This approach views safety as an input to the design considerations, rather than being fundamental to the design considerations. Effective Safety Culture requires much more than this. It is fundamentally about finding potential hazards and to the degree possible – eliminating them, rather than responding to them.

Additionally, t~~T~~he Board would like to see DOE go beyond discussions and surveys related to its safety culture improvement efforts and take steps to generically test the concepts defined above, to see whether they are indeed put into practice, and correct any deficiencies that are identified as a result. Testing should involve actual work and work practices at Hanford (e.g. cleanout of the Plutonium Reclamation Facility, work in Tank Farms, designing a new facility or operation such as the Direct Feed Low Activity Waste Facility), and initially having several groups work through these questions as applied to those tasks. Once any issues are identified and resolved in this process, DOE should consider applying it more broadly as part of initial employee training and on-going evaluation of safety culture. The Board further recommends that this be done separately involving workers, managers, designers and others, and that the results of each group be compared and contrasted.

Advice

- The Board advises DOE to add a new phrase **Safe by Design**** to DOE's safety culture lexicon**. Safe by Design****: Safety designed and built into systems from the start. Constantly question and challenge design, operations, procedures, and actions.
- The Board advises DOE to test its definitions of Organizational Culture, Safety Culture and Safety Conscious Work environment, as well as Safe by Design**; using a series of questions (attachment one) to help identify whether management and the work force have a shared understanding of these topics and of the expected outcomes.
- The Board advises DOE to further test these areas by developing a series of actual work scenarios across the Hanford site representing a broad cross section of work types (operations, maintenance, clean-up, design, and construction) and to again apply these questions to assess

whether and how well the definitions and ideas are being applied, and where additional training and/or changes may be needed.

- The Board advises DOE to conduct these tests both with teams composed solely of groups of workers, management, designers, etc. to determine whether there is a shared understanding and agreement on this work among the different groups and whether additional changes, training or other work is needed, and then again with blended teams involving all types of workers involved in a project.
- The Board advises DOE to place special emphasis on "Safe by Design**" - designing safety into work and projects from the earliest possible moment and at each revision through construction to operation, rather than adding safety features late in the process.
- The Board advises DOE to ensure that strong environmental and public health protection is incorporated in and applied throughout all of these organizational and safety culture processes, to ensure that the environment and public health is protected.

** We might use an alternate phrase, such as "Safety Foundation" instead of "Safe by Design".

ATTACHMENT ONE

ORGANIZATIONAL CULTURE

Beliefs, Expectations, Values -> direct, guide, influence -> behavior and actions

- What specifically are the organizations Beliefs, Expectations, and Values?
    - Where are these documented?
    - What is the reasoning/basis for each and their interactions?
- How are these communicated?
- How are these applied?
- What/which attribute(s) is most important? Rank order.
- How are conflicts between these resolved?
- How are these attributes challenged, revised, and perpetuated?
- Do Evaluation/Assessment of actions lead to Rewards &/or Consequences?
- Who specifically is responsible, what are they responsible for, and to whom are they responsible?
- How are individual accountability and responsibility assured?

SAFETY CULTURE

Values, Behaviors -> modeled by leaders, managers, supervisors -> acted on by everyone

- What specifically are the organizations Values, and Behaviors?
    - Where are these documented?
    - How are these communicated?
- What/which is most important? Rank order.
- How are these behaviors and values modeled?
- How are the results of their application assessed?
- Where are these values and behaviors and the tests of their application documented?
- Are there feedback & lessons learned from their application?
- Do Evaluation/Assessment of actions lead to Rewards &/or Consequences?
- Who specifically is responsible, what are they responsible for, and to whom are they responsible?
- How are individual accountability and responsibility assured?

SAFETY CONSCIOUS WORK ENVIRONMENT

Everyone feels safe to raise issues -> alternate paths to raise and resolve issues -> evaluation, feedback, confirmation, learning

- How are the results of the application of a safety conscious work environment assessed?
- Where are these assessments documented?
  Who is responsible to read them and learn from them?

- Are there feedback & lessons learned from their application?
- Do Evaluation/Assessment of actions lead to Rewards &/or Consequences?
- Who specifically is responsible, what are they responsible for, and to whom are they responsible?
- How are individual accountability and responsibility assured?

SAFETY BY DESIGN

Safety designed and built into systems from the start. Constantly question and challenge design, operations, procedures, actions

- How is safety designed and built into systems from the start?
- Where are assessments of these methods and processes documented?
- Who is responsible to read them and learn from them?
- Are there feedback & lessons learned from their application?
- Do Evaluation/Assessment of actions lead to Rewards &/or Consequences?
- Who specifically is responsible, what are they responsible for, and to whom are they responsible?
- How are individual accountability and responsibility assured?